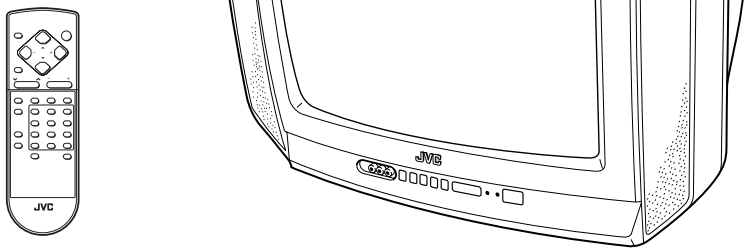
JVC

SERVICE MANUAL

COLOUR TELEVISION

BASIC CHASSIS
CL-M

AV-16N8(VT)



CONTENTS

■ SPECIFICATIONS 2
■ SAFETY PRECAUTIONS 3
■ FEATURES 4
★ OPERATING INSTRUCTIONS (APPENDED) 1-1
■ SPECIFIC SERVICE INSTRUCTIONS 4
■ SERVICE ADJUSTMENTS 10
★ STANDARD CIRCUIT DIAGRAM (APPENDED) 2-1
■ PARTS LIST 27

COPYRIGHT © 2000 VICTOR COMPANY OF JAPAN, LTD.

No. 56094
Sep. 2000

REPLACEMENT OF MEMORY IC

1. MEMORY IC

This TV uses the following memory IC.

Memory IC: IC1702 on MAIN PW Board

The memory IC memorizes data for correctly operating the video and deflection circuits. When replacing the memory IC, be sure to use the same type IC written with the initial values of data. In other words, use the specific IC listed in "PRINTED WIRING BOARD PARTS LIST". For its mounting location, refer to "ADJUSTMENT LOCATIONS".

2. PROCEDURE FOR REPLACING MEMORY IC

(1) Power off

Switch the power off and unplug the power cord from the wall outlet.

(2) Replacing the memory IC

Replace the memory IC with new one. Be sure to use the memory IC written with the initial data values.

(3) Power on

Plug the power cord into the wall outlet and switch the power on.

(4) Check and setting of SYSTEM CONSTANT SET:

1) Press the DISPLAY key and the PICTURE MODE key on the remote control unit simultaneously.
   The SERVICE MENU screen will be displayed. (See Fig. 1.)
2) In the SERVICE MENU, press the DISPLAY key and PICTURE MODE key simultaneously. Then, the SYSTEM CONSTANT SET screen will be displayed. (See Fig. 2.)
3) Check whether the setting values of the SYSTEM CONSTANT SET are the same as those indicated in Table 1. If the value is different, select the setting item with the MENU ▽/△ key, and set the correct value with the MENU – / + key.
4) Press the DISPLAY key twice to return to the normal screen.

(5) Receive channel setting

Refer to the **OPERATING INSTRUCTIONS** and set the receive channels (channels preset).

(6) User setting

Check the user setting values in Table 2, and if setting value is different, set the correct value.
For setting, refer to the **OPERATING INSTRUCTIONS**.

(7) Setting of SERVICE MENU

Verify the setting for each setting item in the SERVICE MENU. (See Table 3.) If readjustment is necessary, perform adjustment referring to "SERVICE ADJUSTMENTS".

SERVICE MENU

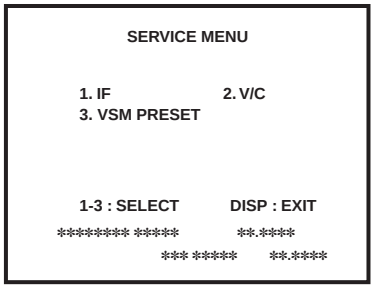


Fig. 1

SYSTEM CONSTANT - I

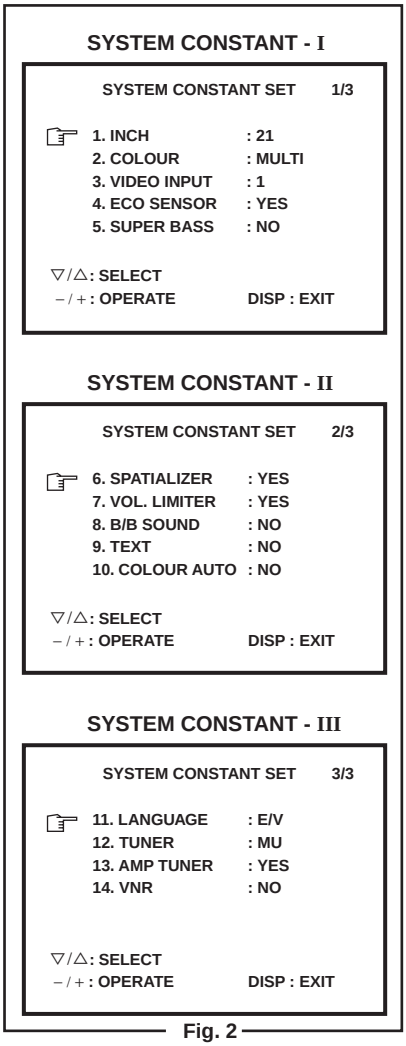
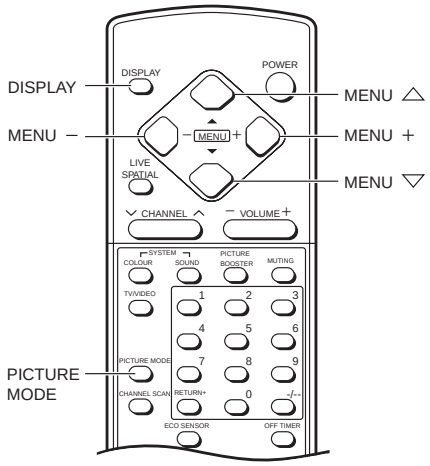

SYSTEM CONSTANT SET 1/3
1. INCH : 21
2. COLOUR : MULTI
3. VIDEO INPUT : 1
4. ECO SENSOR : YES
5. SUPER BASS : NO
▽/△: SELECT
– / + : OPERATE
DISP : EXIT
SYSTEM CONSTANT - II
SYSTEM CONSTANT SET 2/3
6. SPATIALIZER : YES
7. VOL. LIMITER : YES
8. B/B SOUND : NO
9. TEXT : NO
10. COLOUR AUTO : NO
▽/△: SELECT
– / + : OPERATE
DISP : EXIT
SYSTEM CONSTANT - III
SYSTEM CONSTANT SET 3/3
11. LANGUAGE : E/V
12. TUNER : MU
13. AMP TUNER : YES
14. VNR : NO
▽/△: SELECT
– / + : OPERATE
DISP : EXIT

Fig. 2

NAME OF REMOTE CONTROL KEYS



SETTING OF SYSTEM CONSTANT SET

Table 1

Setting item	Setting contents	Setting value
1. INCH	29 → 25 → 21 → 14	21
2. COLOUR	MULTI. → TRIPLE → PAL	MULTI
3. VIDEO INPUT	1 → 3	1
4. ECO SENSOR	YES → NO	YES
5. SUPER BASS	YES → NO	NO
6. SPATIALIZER	YES → NO	YES
7. VOL. LIMITER	YES → NO	YES
8. B/B SOUND	YES → NO	NO
9. TEXT	YES → NO	NO
10. COLOUR AUTO	YES → NO	NO
11. LANGUAGE	E → E/V	E/V
12. TUNER	MU → MA	MU
13. AMP TUNER	YES → NO	YES
14. VNR	YES → NO	NO

USER SETTING VALUES

Table 2

Setting item	Setting value	Setting item	Setting value
SUB POWER	ON	BASS	CENTER
CHANNEL POSITION	1 POSITION	BALANCE	CENTER
CHANNEL PRESET	Refer to OPERATING INSTRUCTION.	OFF TIMER	OFF
VOLUME	Appropriate sound volume	AUTO SHUTOFF	OFF
TV/VIDEO	TV	ECO SENSOR	OFF
ON SCREEN DISPLAY	POSITION NUMBER DISPLAY	LANGUAGE	VIETNAMESE
COLOUR SYSTEM	PAL	BLUE BACK	OFF
SOUND SYSTEM	B / G	ON TIMER	PR1 0:00
PICTURE MODE (VSM)	BRIGHT	CHILD LOCK	OFF
LIVE SPATIAL	OFF	PICTURE BOOSTER	OFF
TREBLE	CENTER		

SERVICE MENU SETTING ITEMS

Table 3

Service menu	Setting item	Service menu	Setting item
1. IF	1. VCO 2. DELAY POINT	**3. VSM PRESET (BRIGHT/STD/SOFT)**	TINT COLOUR BRIGHT CONT. SHARP **Do not adjust.**
2. V / C	1. CUTOFF(R/G/B) 2. DRIVE(R/B) 3. BRIGHT 4. CONT. 5. COLOUR 6. TINT (TV/VIDEO) 7. BLACK OFFSET(R-Y/B-Y) 8. SHARP 9. TEXT(RGB)CONT. 10. H. CENTER 11. V. HEIGHT 12. V. LIN 13. V.S-CR 14. V. CENTER 15. AMP T. SHARP **Do not adjust.**		

SERVICE ADJUSTMENTS

BEFORE STARTING SERVICE ADJUSTMENT

1. **There are 2 ways for adjusting this TV: One is with the REMOTE CONTROL UNIT and the other is the conventional method using adjustment parts and components.**
2. **The setting (adjustment) using the REMOTE CONTROL UNIT is made on the basis of the initial setting values. The setting values which adjust the screen to the optimum condition can be different from the initial setting values.**
3. Make sure that connection is correctly made to AC power source.
4. Turn on the power of the TV and measuring instrument for warming up for at least 30 minutes before starting adjustment.
5. If the receive or input signal is not specified, use the most appropriate signal for adjustment.
6. Never touch parts (such as variable resistors, transformers and capacitors) not shown in the adjustment items of this service adjustment.
7. Preparation for adjustment (presetting):
   Unless otherwise specified in the adjustment items, preset the following functions with the remote control unit.

Function	Setting value
PICTURE MODE (VSM)	BRIGHT
COLOUR/BRIGHT/CONT./SHARP	See "VSM Preset" on page 23.
OFF TIMER	OFF
ECO SENSOR	OFF
BLUE BACK	OFF
PICTURE BOOSTER	OFF

MEASURING INSTRUMENT AND FIXTURES

1. DC voltmeter (or Digital voltmeter)
2. Oscilloscope
3. Signal generator (Pattern generator)
   [PAL / SECAM / NTSC]
4. Remote control unit

ADJUSTMENT/CHECK ITEMS

Adjustment/Check item	Page
B1 POWER SUPPLY Check	14
FOCUS Adjustment	14
IF CIRCUIT Adjustment	14
V/C (VIDEO/CHROMA) CIRCUIT Adjustment	15
DEFLECTION CIRCUIT Adjustment	21
VSM PRESET Adjustment	23
PURITY, CONVERGENCE Adjustment	24

BASIC OPERATION IN SERVICE MENU

1. **TOOL OF SERVICE MENU OPERATION**
   Operate the SERVICE MENU with the remote control unit.

2. **SERVICE MENU ITEMS**
   With the SERVICE MENU, various settings (adjustments) can be made, and they are broadly classified in the following items of settings:

   - 1. IF ..... For entering/adjusting the setting values (adjustment values) of the IF circuit.
   - 2. V/C ..... For entering/adjusting the setting values (adjustment values) of the VIDEO/CHROMA and DEFLECTION circuits.
   - 3. VSM PRESET ..... For setting the values of STANDARD, SOFT and BRIGHT (VSM: video status memory)

3. BASIC OPERATION IN SERVICE MENU

(1) How to enter SERVICE MENU

Press the DISPLAY key and the PICTURE MODE key on the remote control unit simultaneously.
The SERVICE MENU screen will be displayed. (See Fig. 1.)

(2) Selection of SUB MENU SCREEN

Press one of the keys 1 ~ 3 on the remote control unit, and select the SUB MENU SCREEN from the SERVICE MENU. (See Fig. 2.)

SERVICE MENU → SUB MENU

1. IF
2. V / C
3. VSM PRESET

SERVICE MENU

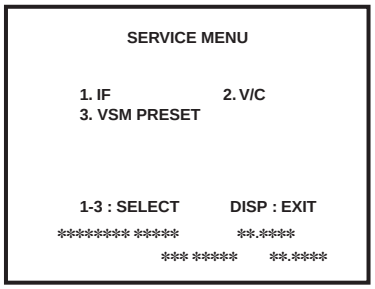


Fig. 1

SUB MENU SCREEN

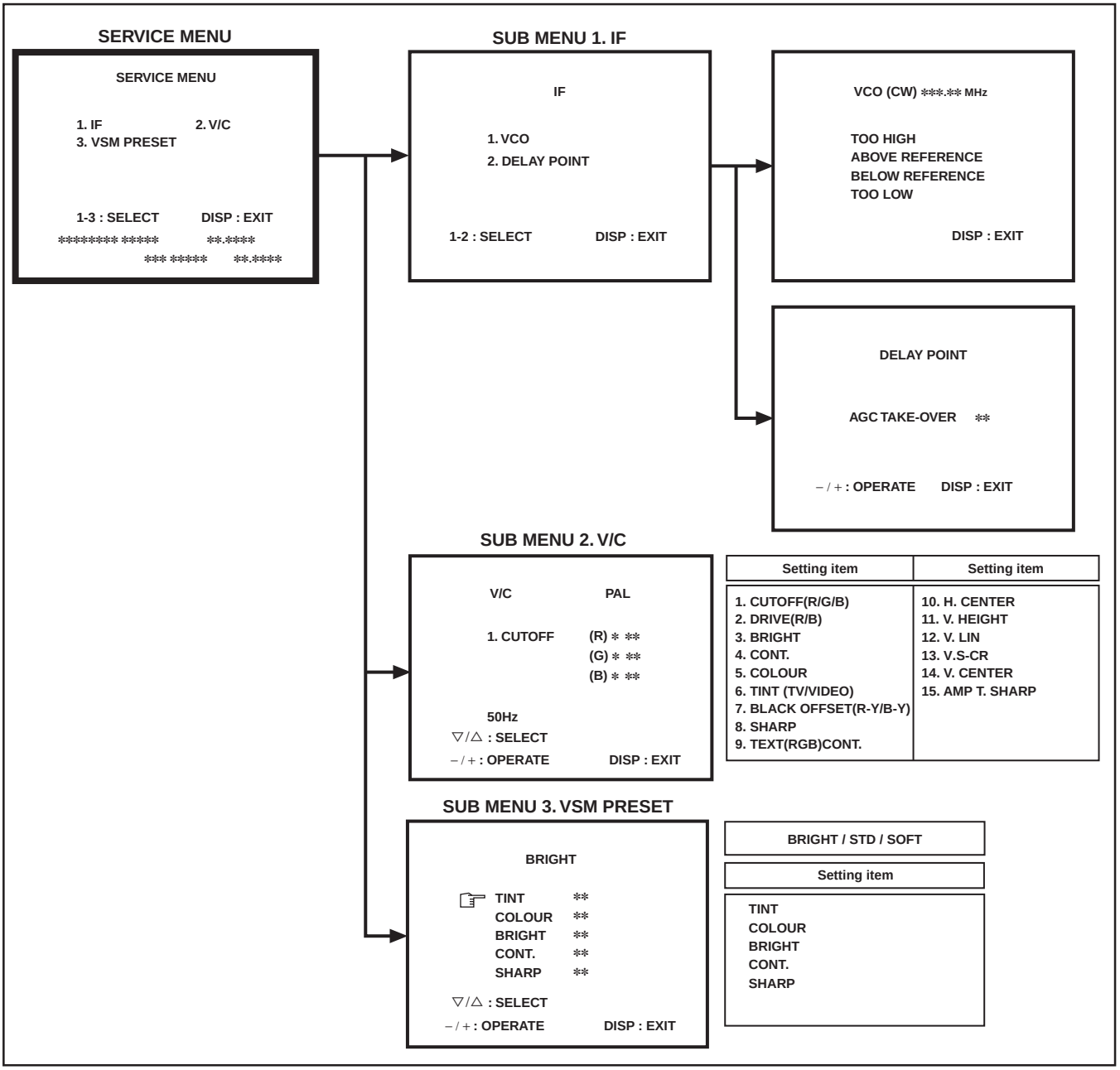


Fig. 2

(3) Method of Setting

*Once the setting values are set, they are memorized automatically.
*It must not adjust without inputting a signal.

1) 1. IF

[1. VCO]

(a) 1 Key ..... Select **1. IF**.
(b) 1 Key ..... Select 1. VCO. (CW)
(c) VCO(CW) TRANSF. ..... Adjust VCO(CW) while watching the colour (yellow/blue) of the characters on the screen.
(d) DISPLAY Key ..... When this is pressed twice, you will return to the SERVICE MENU.

[2. DELAY POINT]

(a) 1 Key ..... Select **1. IF**.
(b) 2 Key ..... Select 2. DELAY POINT.
(c) MENU – / + Key ..... Adjust the setting value.
(d) DISPLAY Key ..... When this is pressed twice, you will return to the SERVICE MENU.

2) 2. V/C and 3. VSM PRESET

(a) 2 and 3 Keys ..... Select **2. V/C and 3. VSM PRESET.**
(b) MENU ▽/△ key ..... Select setting items.
(c) MENU – / + Key ..... Adjust the setting values of the setting items.
● Use the number keys on the remote control unit for setting of WHITE BALANCE and BLACK OFFSET. For the setting, refer to each item concerned.
(d) DISPLAY Key ..... When this is pressed, you will return to the SERVICE MENU.

(4) Release of SERVICE MENU

After completing the setting, return to the SERVICE MENU by pressing the DISPLAY key, then again press the DISPLAY key to return to the normal screen.

ADJUSTMENTS

B1 POWER SUPPLY

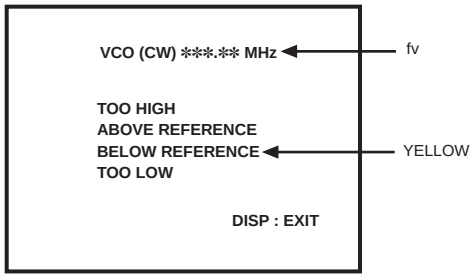
Item	Measuring instrument	Test point	Adjustment part	Description
Check of B1 POWER SUPPLY	**Signal Generator** **DC Voltmeter**	**TP-91 (B1) TP-E (⏚) [S1 connector]**		1. Receive a whole black signal. 2. Connect a DC voltmeter between TP-91 (B1) and TP-E (⏚) (between pins 1 and 5 of the connector S1). 3. Make sure that the voltage is **DC114.5 ± 1.5V**.

FOCUS ADJUSTMENT

Item	Measuring instrument	Test point	Adjustment part	Description
Adjustment of FOCUS	**Signal generator**		**FOCUS VR [In HVT]**	1. Receive a cross-hatch signal. 2. While watching the screen, adjust the FOCUS VR to make the vertical and horizontal lines as fine and sharp as possible. 3. Make sure that, when the screen is darkened, the lines remain in good focus.

IF CIRCUIT ADJUSTMENT

Item	Measuring instrument	Test point	Adjustment part	Description
Adjustment of VCO (CW)	**Remote control unit**		**VCO (CW) TRANSF. [MAIN PWB]**	● **Under normal conditions, no adjustment is required.** 1. Select **1. IF** from the SERVICE MENU. 2. Press the **1** key to select **1. VCO**. 3. Select a receivable broadcast channel with the CHANNEL key. 4. Turn the core of VCO(CW) TRANSF. until the colour of the characters "TOO HIGH" displayed on the screen changes from blue to **yellow**. (Step 1) 5. Then slowly turn the core of VCO(CW) TRANSF. counterclockwise until the characters "ABOVE REFERENCE" changes from blue to **yellow**. (Step 2) 6. Further slowly turn the core of VCO(CW) TRANSF. until the colour of the characters "BELOW REFERENCE" changes from blue to **yellow**. (Step 3) 7. Press the DISPLAY key three times to return to normal screen. 8. Perform CHANNEL PRESET again, and make sure that each broadcast is being received properly.



Screen display	Step 1 →	2 →	3
TOO HIGH	**Yellow** →	Blue →	Blue
ABOVE REFERENCE	Blue →	**Yellow** →	Blue
BELOW REFERENCE	Blue →	Blue →	**Yellow**
TOO LOW	Blue →	→	Blue

Item	Measuring instrument	Test point	Adjustment part	Description
Adjustment of DELAY POINT	**Remote control unit**		**DELAY POINT (AGC TAKE-OVER)**	1. Receive a black and white signal (colour off). 2. Select **1. IF** from the SERVICE MENU. 3. Select **2. DELAY POINT** by pressing the **2** key on the remote control. 4. Adjust the MENU – or + key until video noise disappears. 5. Press the DISPLAY key three times to return to the normal screen. 6. Turn to other channels and make sure that there are no irregularities.

Setting (Adjustment) item	Variable range	Initial setting value
DELAY POINT (AGC TAKE-OVER)	0 ~ 63	20

V/C (VIDEO/CHROMA) CIRCUIT ADJUSTMENT

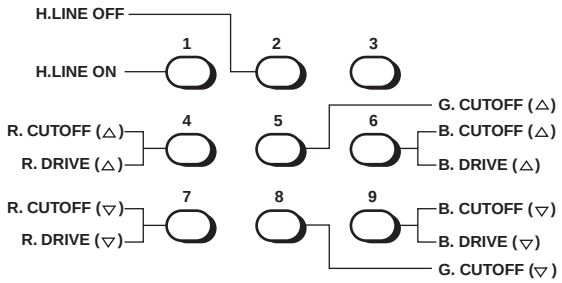
The setting (adjustment) using the remote control unit is made on the basis of the initial setting values.
The setting values which adjust the screen to the optimum condition can be different from the initial setting values.
- **Do not change the initial setting values of the setting (adjustment) items not listed in "ADJUSTMENT".**

[SUB MENU 2. V/C (1. CUT OFF (R / G / B) ~ 9. TEXT (RGB) CONT. and 15. T. AMP SHARP)]

Setting item \ Colour system		Variable range	Initial setting value			
			PAL	SECAM	NTSC 3.58	NTSC 4.43
1. CUT OFF (R / G / B)		–128 ~ +127	0	←	←	←
2. DRIVE (R / B)		–128 ~ +127	0	←	←	←
3. BRIGHT		–64 ~ +63	–11	←	←	←
4. CONT.		–58 ~ +28	–10	←	←	←
5. COLOUR		–60 ~ +67	+7	+11	+12	–2
6. TINT	TV / VIDEO	–64 ~ +63	———	———	+5 / 0	–2 / 0
7. BLACK OFFSET (R-Y / B-Y)		–8 ~ +7	———	0 / 0	———	———
8. SHARP	TV / VIDEO	–32 ~ +31	+5 / +3	←	←	←
9. TEXT (RGB) CONT.		–128 ~ +127	+15	←	←	←
15. AMP T. SHARP		–128 ~ +127	–15	←	←	←

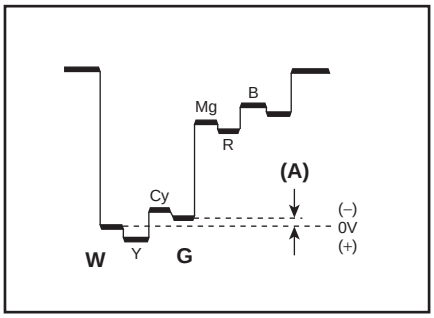
: Do not adjust.

<table>
<tr><th>Item</th><th>Measuring instrument</th><th>Test point</th><th>Adjustment part</th><th>Description</th></tr>
<tr><td>Adjustment of WHITE BALANCE (Low light)</td><td>● Signal generator
● Remote control unit</td><td></td><td>1. CUTOFF (R)
CUTOFF (G)
CUTOFF (B)

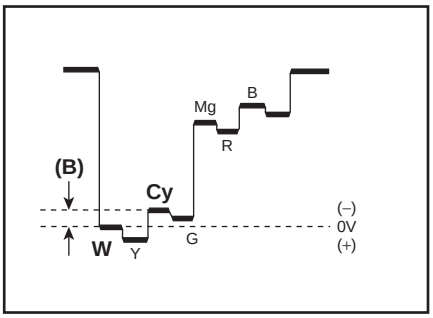
SCREEN VR (In HVT)</td><td>1. Receive a black and white signal (colour off).
2. Select 2. V/C from the SERVICE MENU.
3. Select 1. CUTOFF (R), (G) and (B) with MENU ▽/△ key, and set each value to initial setting value with 4 ~ 9 keys on the remote control unit.
4. Press the 1 key on the remote control unit to produce a single horizontal line.
5. Turn the SCREEN VR fully counterclockwise, then slowly turn it clockwise to where a red, blue, or green colour is faintly visible.
6. Use keys 4 ~ 9 on the remote control unit and adjust the other 2 colours to where the single horizontal line appears white.
7. Turn the SCREEN VR to where the single horizontal line glows faintly.
8. Press the 2 key to return to 1. CUTOFF screen.
9. Press the DISPLAY key twice to return to the normal screen.</td></tr>
<tr><td colspan="4">V/C PAL
1. CUTOFF (R) ∗ ∗∗
(G) ∗ ∗∗
(B) ∗ ∗∗
50Hz
▽/△ : SELECT
– / + : OPERATE DISP : EXIT</td></tr>
<tr><td colspan="4">REMOTE CONTROL UNIT
 
</td></tr>
<tr><td colspan="4">Setting (Adjustment) item | Variable range | Initial setting value
1. CUT OFF R: –128 ~ +127: 0
1. CUT OFF G: –128 ~ +127: 0
1. CUT OFF B: –128 ~ +127: 0</td></tr>
<tr><td>Adjustment of WHITE BALANCE (High light)</td><td>● Signal generator
● Remote control unit</td><td></td><td>2. DRIVE (R)
DRIVE (B)</td><td>1. Receive a black and white signal (colour off).
2. Select 2. V/C from the SERVICE MENU.
3. Select 2. DRIVE (R) / (B) with MENU ▽/△ key, and set each value to initial setting value with 4 and 7 keys, or 6 and 9 keys on the remote control unit.
4. Use the keys 4 and 7 or 6 and 9 to produce a white screen.
5. Press the DISPLAY key twice to return to the normal screen.</td></tr>
<tr><td colspan="4">V/C PAL
2. DRIVE (R) ∗ ∗∗
(B) ∗ ∗∗
50Hz
▽/△ : SELECT
– / + : OPERATE DISP : EXIT</td></tr>
<tr><td colspan="4">Setting (Adjustment) item | Variable range | Initial setting value
2. DRIVE R: –128 ~ +127: 0
2. DRIVE B: –128 ~ +127: 0</td></tr>
</table>

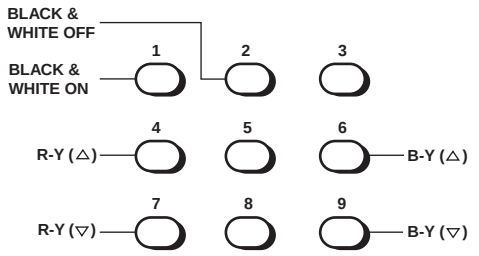
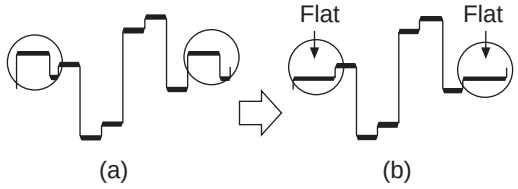
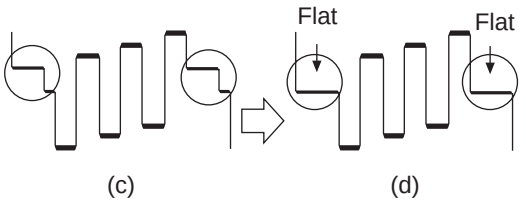
Item	Measuring instrument	Test point	Adjustment part	Description
Adjustment of SUB BRIGHT	**Remote control unit**		**3. BRIGHT**	1. Receive any broadcast. 2. Select **2. V/C** from the SERVICE MENU. 3. Select **3. BRIGHT** with the MENU ▽/△ key. 4. Set the initial setting value with the MENU – or + key. 5. If the brightness is not the best with the initial set value, make fine adjustment until you get the best brightness. 6. Press the DISPLAY key twice to return to the normal screen.
Adjustment of SUB CONT.	**Remote control unit**		**4. CONT.**	1. Receive any broadcast. 2. Select **2. V/C** from the SERVICE MENU. 3. Select **4. CONT.** with the MENU ▽/△ key. 4. Set the initial setting value with the MENU – or + key. 5. If the contrast is not the best with the initial set value, make fine adjustment until you get the best contrast. 6. Press the DISPLAY key twice to return to the normal screen.
Adjustment of SUB COLOUR-I	**Remote control unit**		**5. COLOR**	**[Method of adjustment without measuring instrument]**
			PAL COLOUR	**(PAL COLOUR)** 1. Receive a PAL broadcast. 2. Select **2. V/C** from the SERVICE MENU. 3. Select **5. COLOUR** with the MENU ▽/△ key. 4. Set the initial setting value for PAL COLOUR with the MENU – or + key. 5. If the colour is not the best with the initial set value, make fine adjustment until you get the best colour. 6. Press the DISPLAY key twice to return to the normal screen.
			SECAM COLOUR	**(SECAM COLOUR)** 1. Receive a SECAM broadcast. 2. Make fine adjustment of SECAM COLOUR in the same way as for "PAL COLOUR".
			NTSC 3.58 COLOUR	**(NTSC 3.58 COLOUR)** 1. Receive a NTSC 3.58MHz broadcast. 2. Make similar fine adjustment of NTSC 3.58 COLOUR in the same way as for "PAL COLOUR".
				(NTSC 4.43 COLOUR) When adjustment is done for NTSC 3.58 COLOUR, appropriate values are automatically set for NTSC 4.43 COLOUR.

Item	Measuring instrument	Test point	Adjustment part	Description
Adjustment of SUB COLOUR-II	● **Signal generator** ● **Oscillo-scope** ● **Remote control unit**	**TP-47G TP-E (⏚) [CRT SOCKET PWB]**	**5. COLOUR**	**[Method of adjustment using measuring instrument]**
			PAL COLOUR	**(PAL COLOUR)** 1. Receive a PAL full field colour bar signal (75% white). 2. Select **2. V/C** from the SERVICE MENU. 3. Select **5. COLOUR** with the MENU ▽/△ key. 4. Set the initial setting value of PAL COLOUR with the MENU – or + key. 5. Connect the oscilloscope between TP-47G and TP-E. 6. Adjust PAL COLOUR to set the value **(A)** in the figure to **+11V (W & G)**.
			SECAM COLOUR	**(SECAM COLOUR)** 1. Receive a SECAM full field colour bar signal (75% white). 2. Set the initial setting value of SECAM COLOUR with the MENU – or + key. 3. Adjust SECAM COLOUR to set the value **(A)** in the figure to **+10V (W & G)**.
			NTSC 3.58 COLOUR	**(NTSC 3.58 COLOUR)** 1. Receive a NTSC 3.58 full field colour bar signal (75% white). 2. Set the initial setting value of NTSC 3.58 COLOUR with the MENU – or + key. 3. Adjust NTSC 3.58 COLOUR to set the value **(A)** in the figure to **+9V (W & G)**.
				(NTSC 4.43 COLOUR) When adjustment is done for NTSC 3.58 COLOUR, appropriate values are automatically set for NTSC 4.43 COLOUR.



Item	Measuring instrument	Test point	Adjustment part	Description
Adjustment of SUB TINT-I	**Remote control unit**		**6. TINT**	**[Method of adjustment without measuring instrument]**
			NTSC 3.58 TINT	**(NTSC 3.58 TINT)** 1. Receive a NTSC 3.58 colour bar signal (full field colour bar 75% white). 2. Select **2. V/C** from the SERVICE MENU. 3. Select **6. TINT** with the MENU ▽/△ key. 4. Set the initial setting value of NTSC 3.58 with the MENU – or + key. 5. If you cannot get the best tint with the initial setting value, make fine adjustment until you get the best tint. 6. Press the DISPLAY key twice to return to the normal screen.
				(NTSC 4.43 COLOUR) When adjustment is done for NTSC 3.58 TINT, appropriate values are automatically set for NTSC 4.43 TINT.
Adjustment of SUB TINT-II	● **Signal generator** ● **Oscillo-scope** ● **Remote control unit**	**TP-47G TP-E (⏚) [CRT SOCKET PWB]**	**6. TINT**	**[Method of adjustment using measuring instrument]**
			NTSC 3.58 TINT	**(NTSC 3.58 TINT)** 1. Receive a NTSC 3.58 colour bar signal (full field colour bar 75% white). 2. Select **2. V/C** from the SERVICE MENU. 3. Select **6. TINT** with the MENU ▽/△ key. 4. Set the initial setting value of NTSC 3.58 with the MENU – or + key. 5. Connect the oscilloscope between TP-47G and TP-E. 6. Adjust NTSC 3.58 TINT to set the value **(B)** in the figure to **+8V (W & Cy)**. 7. Press the DISPLAY key twice to return to the normal screen.
				(NTSC 4.43 TINT) When adjustment is done for NTSC 3.58 TINT, appropriate values are automatically set for NTSC 4.43 TINT.



<table>
<tr><th>Item</th><th>Measuring instrument</th><th>Test point</th><th>Adjustment part</th><th>Description</th></tr>
<tr><td rowspan="2">Adjustment of BLACK OFFSET-I (SECAM)</td><td rowspan="2">Remote control unit</td><td rowspan="2"></td><td></td><td>[Method of adjustment without measuring instrument]</td></tr>
<tr><td>7. BLACK OFFSET
(R-Y)
(B-Y)</td><td>1. Receive a SECAM broadcast.
2. Select 2. V/C from the SERVICE MENU.
3. Select 7. BLACK OFFSET with the MENU ▽/△ key.
4. Set the initial setting value for BLACK OFFSET (R-Y) and (B-Y) with 4 and 7 or 6 and 9 keys on the remote control unit.
5. If the picture is not the best with the initial setting value, make fine adjustment until you get the best picture.
6. Press the DISPLAY key twice to return to the normal screen.</td></tr>
<tr><td colspan="4">REMOTE CONTROL UNIT
 
</td></tr>
<tr><td rowspan="2">Adjustment of BLACK OFFSET-II (SECAM)</td><td rowspan="2">● Signal generator
● Oscillo-scope
● Remote control unit</td><td rowspan="2">35 PIN (R-Y)
36 PIN (B-Y)
IC 201 on MAIN PWB</td><td></td><td>[Method of adjustment using measuring instrument]</td></tr>
<tr><td>7. BLACK OFFSET
(R-Y)
(B-Y)</td><td>1. Receive a SECAM COLOUR bar signal (full field colour bar 75% white).
2. Select 2. V/C from the SERVICE MENU.
3. Select 7. BLACK OFFSET with the ▽/△ key.
4. Connect the oscilloscope between pin 35 of IC 201 and TP-E.
5. By using 4 and 7 keys on the remote control unit, adjust the BLACK OFFSET (R-Y) so that the waveform changes from (a) to (b) as shown in the figure.
6. Connect the oscilloscope between pin 36 of IC 201 and TP-E.
7. By using 6 and 9 keys on the remote control unit, adjust the BLACK OFFSET (B-Y) so that the waveform changes from (c) to (d) as shown in the figure.
8. If the picture is not the best with the adjusted picture, make fine adjustment until you get the best picture.
9. Press the DISPLAY key twice to return to the normal screen.</td></tr>
<tr><td colspan="4">[R-Y]
 
</td></tr>
<tr><td colspan="4">[B-Y]
 
</td></tr>
</table>

DEFLECTION CIRCUIT ADJUSTMENT

- There are 2 modes of adjustment (initial setting value) — 50Hz mode and 60Hz mode — depending upon the kind of signals (vertical frequency 50Hz / 60Hz).
- When adjusted in 50Hz mode, 60Hz mode will be automatically set.

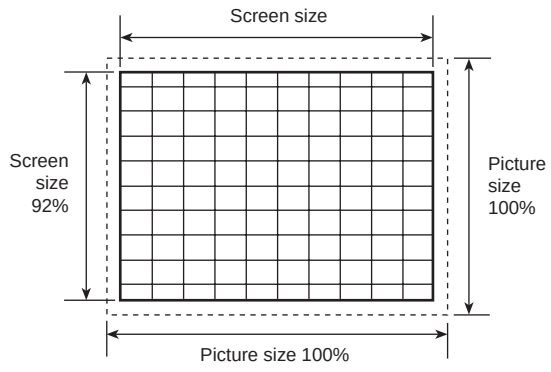
The setting (adjustment) using the remote control unit is made on the basis of the initial setting values.
The setting values which adjust the screen to the optimum condition can be different from the initial setting values.

[SUB MENU 2. V/C (10. H. CENTER ~ 14. V. CENTER)]

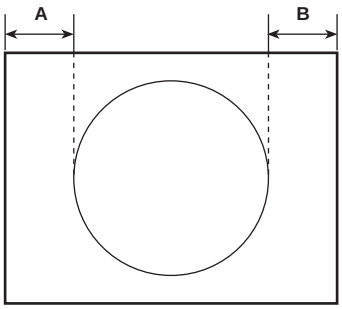
Setting item	Adjustment name	Variable range	Initial setting value	
			50Hz	60Hz
10. H. CENTER	Horizontal center	–16 ~ +15	–10	–10
11. V. HEIGHT	Vertical height	–64 ~ +63	–15	0
12. V. LIN	Vertical linearity	–16 ~ +15	0	0
13. V.S-CR	Vertical height correction	–64 ~ +63	–15	0
14. V. CENTER	Vertical center	0 ~ +127	0 **(Fixed)**	0 **(Fixed)**

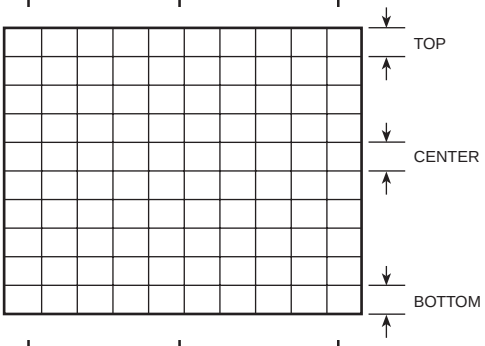
: Do not adjust.

Item	Measuring instrument	Test point	Adjustment part	Description
Adjustment of V. HEIGHT	● **Signal generator** ● **Remote control unit**		**11. V. HEIGHT**	**[fv : 50Hz mode]** 1. Receive a cross-hatch signal. 2. Select **2. V/C** from the SERVICE MENU. 3. Select **11. V. HEIGHT** with the MENU ▽/△ key. 4. Set the initial setting value of **11. V. HEIGHT** with the MENU – / + key. 5. Adjust V. HEIGHT and make the vertical screen size 92% of the picture size with the MENU – / + key. (to be continued)



Item	Measuring instrument	Test point	Adjustment part	Description
Adjustment of H. CENTER			**10. H. CENTER**	6. Receive a circle pattern signal. 7. Select **10. H. CENTER** with the MENU ▽/△ key. 8. Set the initial setting value of **10. H. CENTER** with the MENU – / + key. 9. Adjust H. CENTER to make "**A = B**" with the MENU – / + key.
Adjustment of V.S-CR & V. LIN			**13. V.S-CR** **12. V. LIN**	● **When the vertical linearity has been deteriorated remarkably, perform the following steps.** 10. Receive a cross-hatch signal. 11. Select 1**3. V.S-CR** with the MENU ▽/△ key. 12. Set the initial setting value of **13. V.S-CR** with the MENU – / + key. 13. Select **12. V. LIN** with the MENU ▽/△ key. 14. Set the initial setting value of **12. V. LIN** with the MENU – / + key. 15. Adjust V.S-CR and V. LIN so that the spaces of each line on TOP, CENTER and BOTTOM become uniform.
				16. Make sure that the adjustment is properly done on the screen of 60Hz mode. 17. Press the DISPLAY key twice to return to the normal screen. **[NOTE]** ● When adjust in 60Hz mode, only 60Hz mode is adjust.

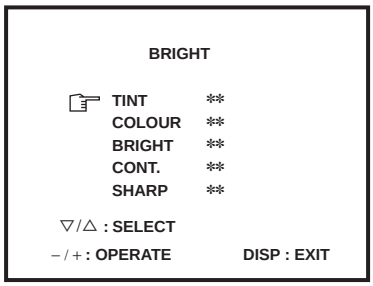




VSM PRESET ADJUSTMENT

Item	Measuring instrument	Test point	Adjustment part	Description
Setting of VSM PRESET	**Remote control unit**		**TINT** **COLOUR** **BRIGHT** **CONT.** **SHARP**	(VSM PRESET) 1. Select **3. VSM PRESET** from the SERVICE MENU. 2. Select BRIGHT with the PICTURE MODE key. 3. Adjust the MENU ▽/△ key and MENU – or + key to reset the set values of **TINT ~ SHARP** to the values shown in the table. 4. Respectively select the VSM PRESET mode for SOFT and STANDARD, and make similar adjustment as in 3 above. 5. Press the DISPLAY key twice to return to the normal screen.

SUB MENU 3. VSM PRESET



[Setting Values for SUB MENU 3. VSM PRESET]

VSM preset mode / VSM Setting item	BRIGHT	STANDARD	SOFT
TINT SETTING VALUE	15	←	←
COLOUR SETTING VALUE	15	←	←
BRIGHT SETTING VALUE	15	←	←
CONT. SETTING VALUE	30	24	17
SHARP SETTING VALUE	15	←	10

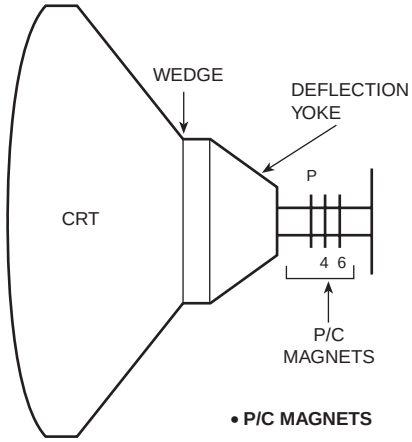
: Do not adjust.

PURITY, CONVERGENCE ADJUSTMENT

Note: The picture tube includes the deflection yoke and purity magnets, and purity and convergence adjustments are precisely adjusted at the factory.

PURITY ADJUSTMENT

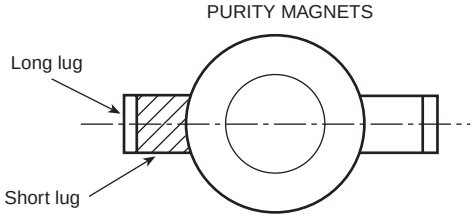
1. Demagnetize CRT with the demagnetizer.
2. Loosen the retainer screw of the deflection yoke.
3. Remove the wedges. (Fig. 1.)
4. Input a green raster signal from the signal generator, and turn the screen to green raster.
5. Move the deflection yoke backward.
6. Bring the long lug of the purity magnets on the short lug and position them horizontally. (Fig. 2)
7. Adjust the gap between two lugs so that the green raster will come into the center of the screen. (Fig. 3)
8. Move the deflection yoke forward, and fix the position of the deflection yoke so that the whole screen will become green.
9. Insert the wedge to the top side of the deflection yoke so that it will not move.
10. Input a cross-hatch signal.
11. Verify that the screen is horizontal.
12. Input red and blue raster signals, and make sure that purity is properly adjusted.



• P/C MAGNETS

P : PURITY MAGNET
4 : 4 POLES (convergence magnets)
6 : 6 POLES (convergence magnets)

Fig. 1



Bring the long lug over the short lug and position them horizontally.

Fig. 2

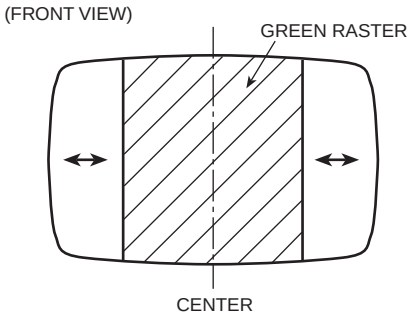


Fig. 3

STATIC CONVERGENCE ADJUSTMENT

1. Input a cross-hatch signal.
2. Using 4-pole convergence magnets, overlap the red and blue lines in the center of the screen (Fig. 1) to turn them to magenta (red/blue).
3. Using 6-pole convergence magnets, overlap the magenta (red/blue) and green lines in the center of the screen to turn them to white.
4. Repeat 2 and 3 above, and make best convergence.

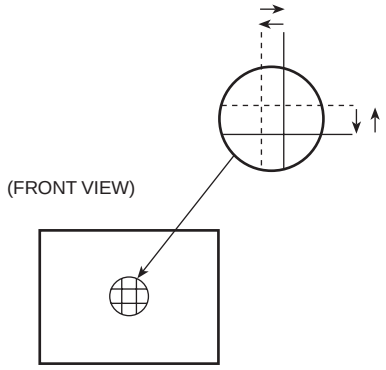


Fig. 1

DYNAMIC CONVERGENCE ADJUSTMENT

1. Move the deflection yoke up and down and overlap the lines in the periphery. (Fig. 2)
2. Move the deflection yoke left to right and overlap the lines in the periphery. (Fig. 3)
3. Repeat 1 and 2 above, and make best convergence.

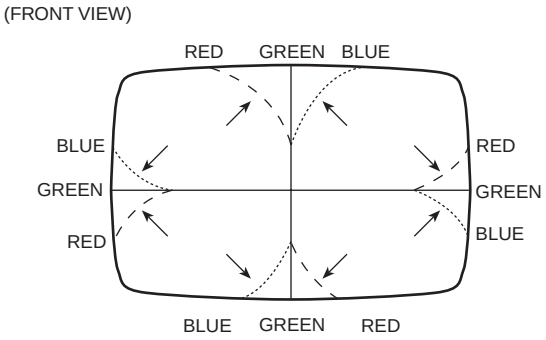


Fig. 2

- After adjustment, fix the wedge at the original position.
  Fasten the retainer screw of the deflection yoke.
  Fix the 6 magnets with glue.

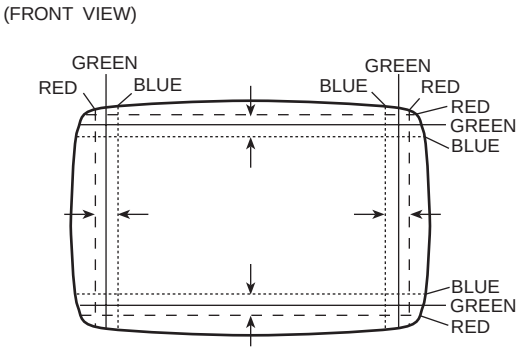


Fig. 3

SELF-CHECK FUNCTIONS

1. Outline

This model has self-check functions given below. When an abnormality has been detected, the SUB POWER is turned off and the ON TIMER LED flashes to inform of the failure. An abnormality is detected by the signal input state of the control line connected to the microcomputer.

2. Self-check items

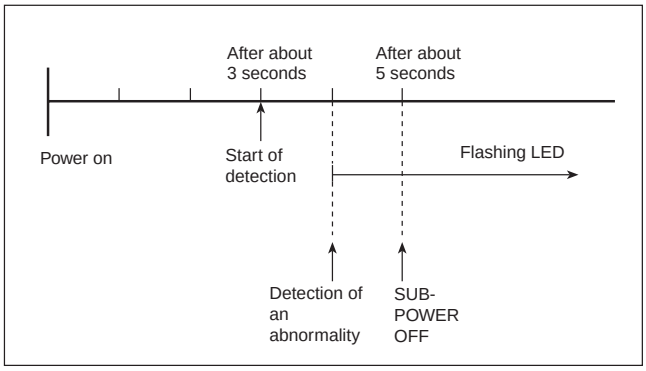
Check item	Details of detection	Method of detection	State of abnormality
Over-current protection	An over-current on the low B line is detected.	The main microcomputer detects the possible abnormality at 30-msec. intervals and judges the results in every 16 time. Of the 16 times, if NG is detected more than 9 times, it is judged that there is an abnormality.	When an abnormality has been detected, the SUB-POWER is turned off. While the SUB-POWER is being turned off, the POWER key on the remote control unit is not operational until the power cord is taken out and put in again.
CRT NECK protection	Operation of CRT NECK protection circuit	DITTO	DITTO

3. Self-check indicating function

At about 3 seconds after the power is turned on, the self-check function starts.

In the case where an abnormality has been detected within the subsequent 2 seconds, the ON TIMER LED flashes, but the SUB-POWER will be turned on when the elapsed time after power on reaches 5 seconds.

When an abnormality has been detected at about 5 seconds after power on, the ON TIMER LED flashes, and then the SUB POWER will be turned off immediately.



[Indication by the LED]

Item	ON TIMER LED flashing intervals	Priority of detection
① Over-current protection	At 0.25-second intervals	1
② CRT NECK protection	At 0.5-second intervals	2

Note: In case of ① + ②, the item ① is indicated.

STANDARD CIRCUIT DIAGRAM

■ NOTE ON USING CIRCUIT DIAGRAMS

1. SAFETY

The components identified by the ⚠ symbol and shading are critical for safety. For continued safety replace safety critical components only with manufactures recommended parts.

2. SPECIFIED VOLTAGE AND WAVEFORM VALUES

The voltage and waveform values have been measured under the following conditions.

(1) Input signal : Colour bar signal
(2) Setting positions of each knob/button and variable resistor
: Original setting position when shipped
(3) Internal resistance of tester : DC 20kΩ/V
(4) Oscilloscope sweeping time : H → 20μS/div
: V → 5mS/div
: Others → Sweeping time is specified.
(5) Voltage values : All DC voltage values

* Since the voltage values of signal circuit vary to some extent according to adjustments, use them as reference values.

3. INDICATION OF PARTS SYMBOL [EXAMPLE]

● In the PW board : R1209 → R209

4. INDICATIONS ON THE CIRCUIT DIAGRAM

(1) Resistors

● Resistance value
No unit : [Ω]
K : [KΩ]
M : [MΩ]

● Rated allowable power
No indication : 1/4 [W]
Others : As specified

● Type
No indication : Carbon resistor
OMR : Oxide metal film resistor
MFR : Metal film resistor
MPR : Metal plate resistor
UNFR : Non-flammable resistor
FR : Fusible resistor

* Composition resistor 1/2 [W] is specified as 1/2S or Comp.

(2) Capacitors

● Capacitance value
1 or higher : [pF]
less than 1 : [μF]

● Withstand voltage
No indication : DC50 [V]
AC indicated : AC withstand voltage [V]
Others : DC withstand voltage [V]

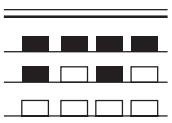
* Electrolytic Capacitors
47/50 [Example]: Capacitance value [μF]/withstand voltage [V]

● Type
No indication : Ceramic capacitor
MY : Mylar capacitor
MM : Metalized mylar capacitor
PP : Polypropylene capacitor
MPP : Metalized polypropylene capacitor
MF : Metalized film capacitor
TF : Thin film capacitor
BP : Bipolar electrolytic capacitor
TAN : Tantalum capacitor

(3) Coils

No unit : [μH]
Others : As specified

(4) Power Supply

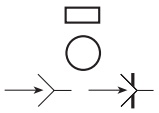

: B1
: 12V
: 9V
: 5V

* Respective voltage values are indicated.

(5) Test point

: Test point
: Only test point display

(6) Connecting method


: Connector
: Wrapping or soldering
: Receptacle

(7) Ground symbol

⊥ : LIVE side ground
⏚ : ISOLATED (NEUTRAL) side ground
⏚ : EARTH ground
⏚ : DIGITAL ground

5. NOTE FOR REPAIRING SERVICE

This model's power circuit is partly different in the GND. The difference of the GND is shown by the LIVE : (⊥) side GND and the ISOLATED (NEUTRAL) : (⏚) side GND. Therefore, care must be taken for the following points.

(1) Do not touch the LIVE side GND or the LIVE side GND and the ISOLATED (NEUTRAL) side GND simultaneously. If the above caution is not respected, an electric shock may be caused. Therefore, make sure that the power cord is surely removed from the receptacle when, for example, the chassis is pulled out.
(2) Do not short between the LIVE side GND and ISOLATED (NEUTRAL) side GND or never measure with a measuring apparatus (oscilloscope, etc.) the LIVE side GND and ISOLATED (NEUTRAL) side GND at the same time. If the above precaution is not respected , a fuse or any parts will be broken.

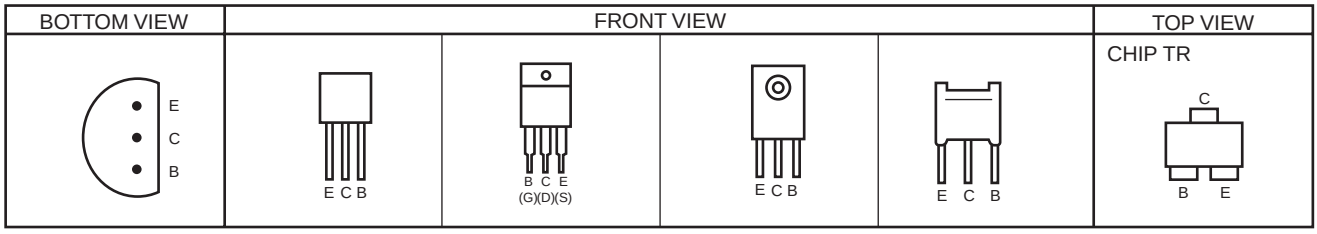
● **Since the circuit diagram is a standard one, the circuit and circuit constants may be subject to change for improvement without any notice.**

CONTENTS

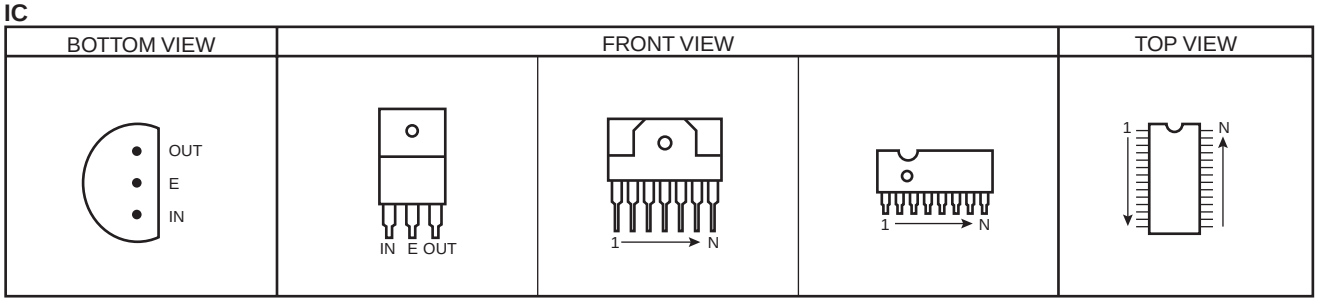
SEMICONDUCTOR SHAPES 2-4
BLOCK DIAGRAM 2-5
CIRCUIT DIAGRAMS
MAIN PWB CIRCUIT DIAGRAM 2-7
CRT SOCKET PWB CIRCUIT DIAGRAM 2-13
PATTERN DIAGRAMS
MAIN PWB PATTERN 2-15
CRT SOCKET PWB PATTERN 2-17

SEMICONDUCTOR SHAPES

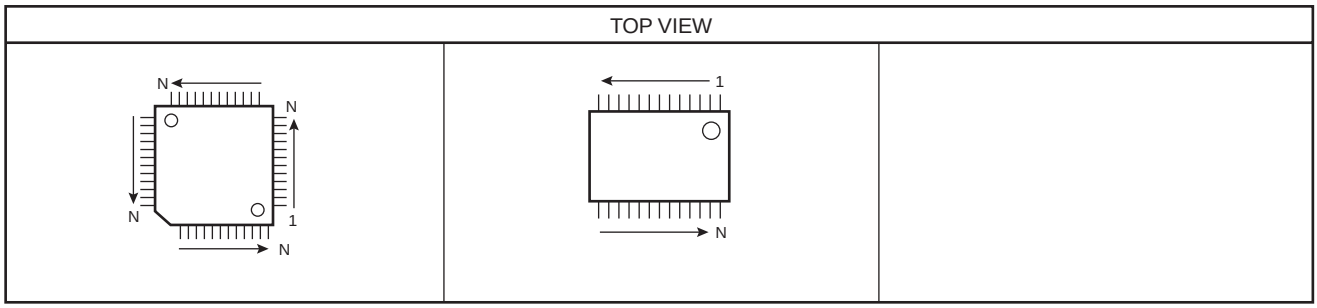
TRANSISTOR



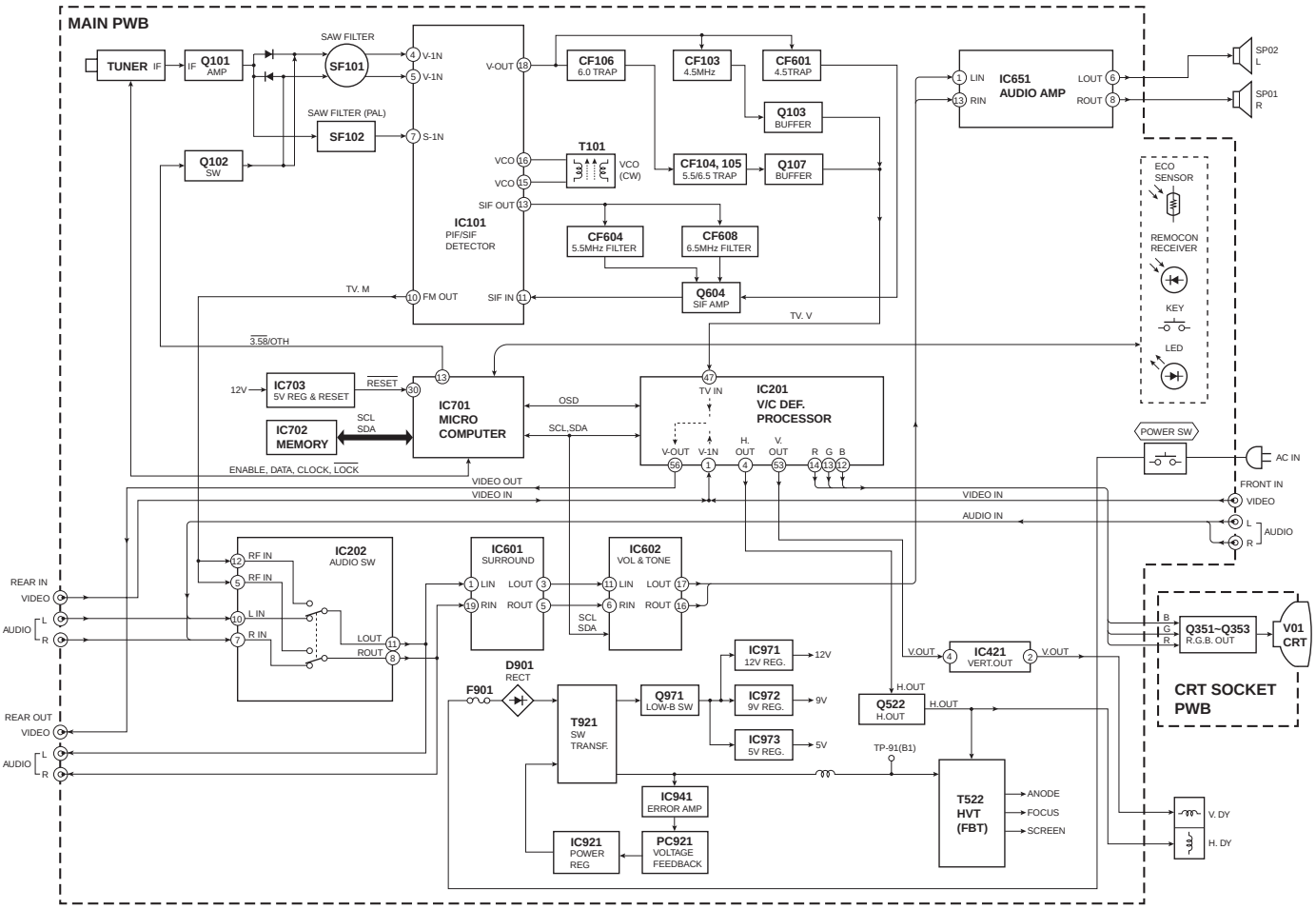
IC



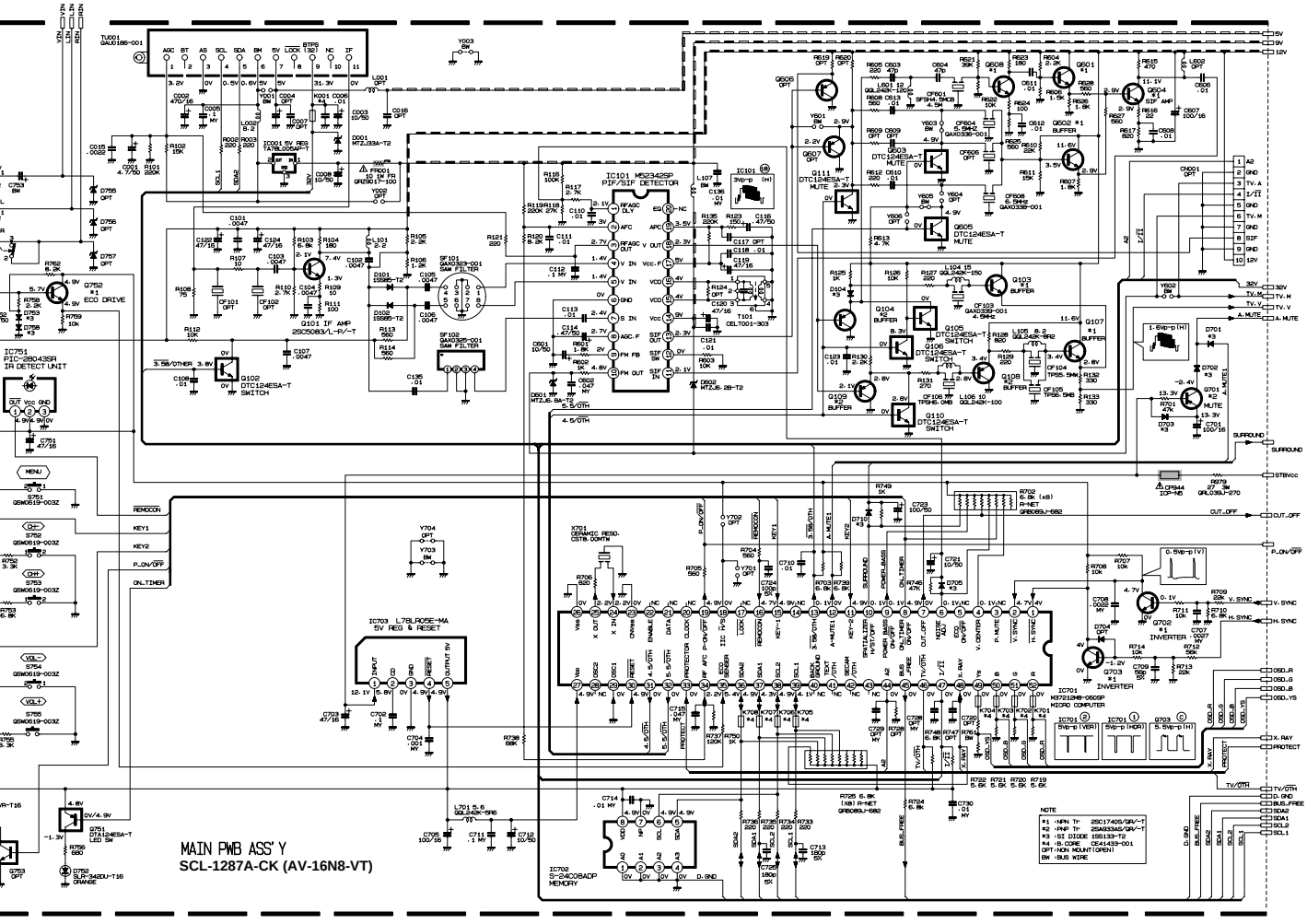
CHIP IC



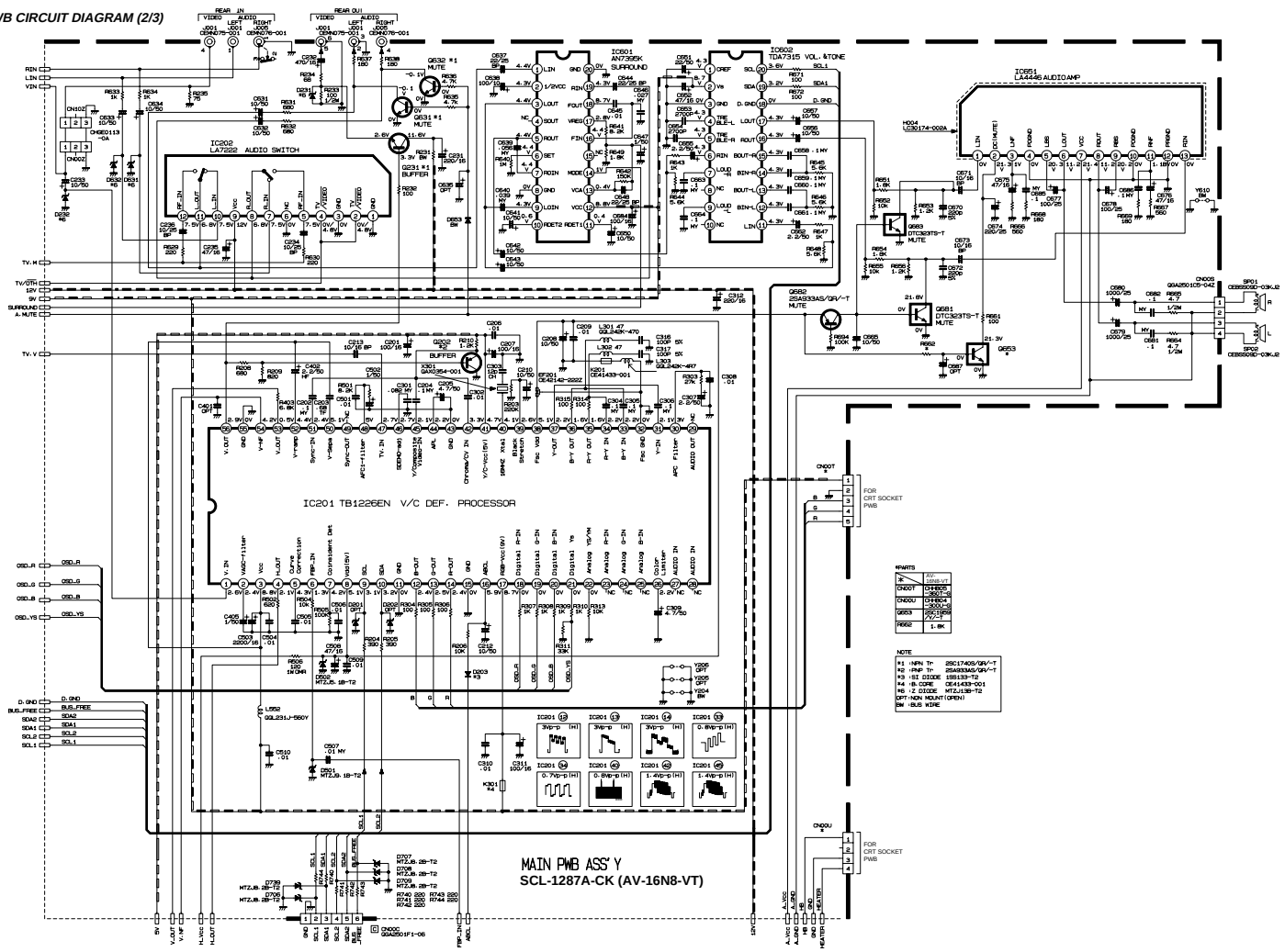
OCK DIAGRAM


MAIN PWB
TUNER
IF
Q101
AMP
SAW FILTER
SF101
V-IN
SAW FILTER (PAL)
SF102
S-IN
Q102
SW
V-OUT
CF106
6.0 TRAP
CF103
4.5MHz
CF601
4.5TRAP
Q103
BUFFER
T101
VCO
(CW)
CF104, 105
5.5/6.5 TRAP
Q107
BUFFER
SIF OUT
IC101
PIF/SIF
DETECTOR
CF604
5.5MHz FILTER
CF608
6.5MHz FILTER
Q604
SIF AMP
FM OUT
SIF IN
TV. M
TV. V
3.58/OTH
IC703
5V REG & RESET
RESET
12V
IC702
MEMORY
SCL
SDA
IC701
MICRO
COMPUTER
OSD
SCL SDA
IC201
V/C DEF.
PROCESSOR
TV IN
V-OUT
V-IN
H.
OUT
V.
OUT
R G B
ENABLE, DATA, CLOCK, LOCK
VIDEO OUT
VIDEO IN
IC651
AUDIO AMP
LIN
RIN
LOUT
ROUT
SP02
L
SP01
R
ECO
SENSOR
REMOCON
RECEIVER
KEY
LED
POWER SW
AC IN
FRONT IN
VIDEO
AUDIO
L
R
IC202
AUDIO SW
RF IN
L IN
R IN
LOUT
ROUT
REAR IN
VIDEO
AUDIO
IC601
SURROUND
IC602
VOL & TONE
SCL
SDA
D901
RECT
F901
T921
SW
TRANSF.
Q971
LOW-B SW
IC971
12V REG.
IC972
9V REG.
IC973
5V REG.
12V
9V
5V
V.OUT
IC421
VERT.OUT
Q522
H.OUT
H.OUT
TP-91(B1)
T522
HVT
(FBT)
ANODE
FOCUS
SCREEN
IC941
ERROR AMP
IC921
POWER
REG
PC921
VOLTAGE
FEEDBACK
REAR OUT
VIDEO
AUDIO
B
G
R
Q351~Q353
R.G.B. OUT
V01
CRT
CRT SOCKET
PWB
V. DY
H. DY

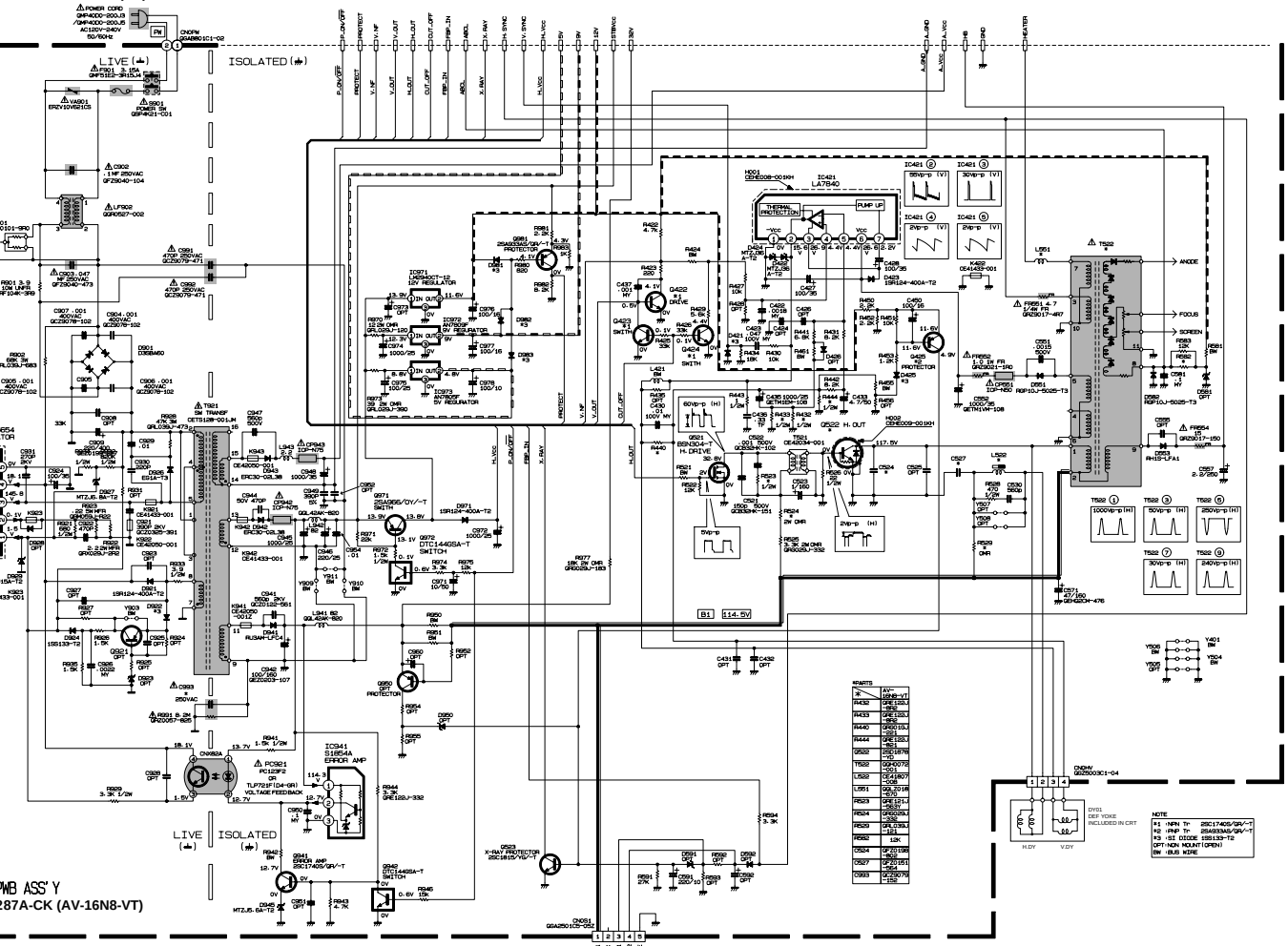
DIAGRAMS *MAIN PWB CIRCUIT DIAGRAM (1/3)*



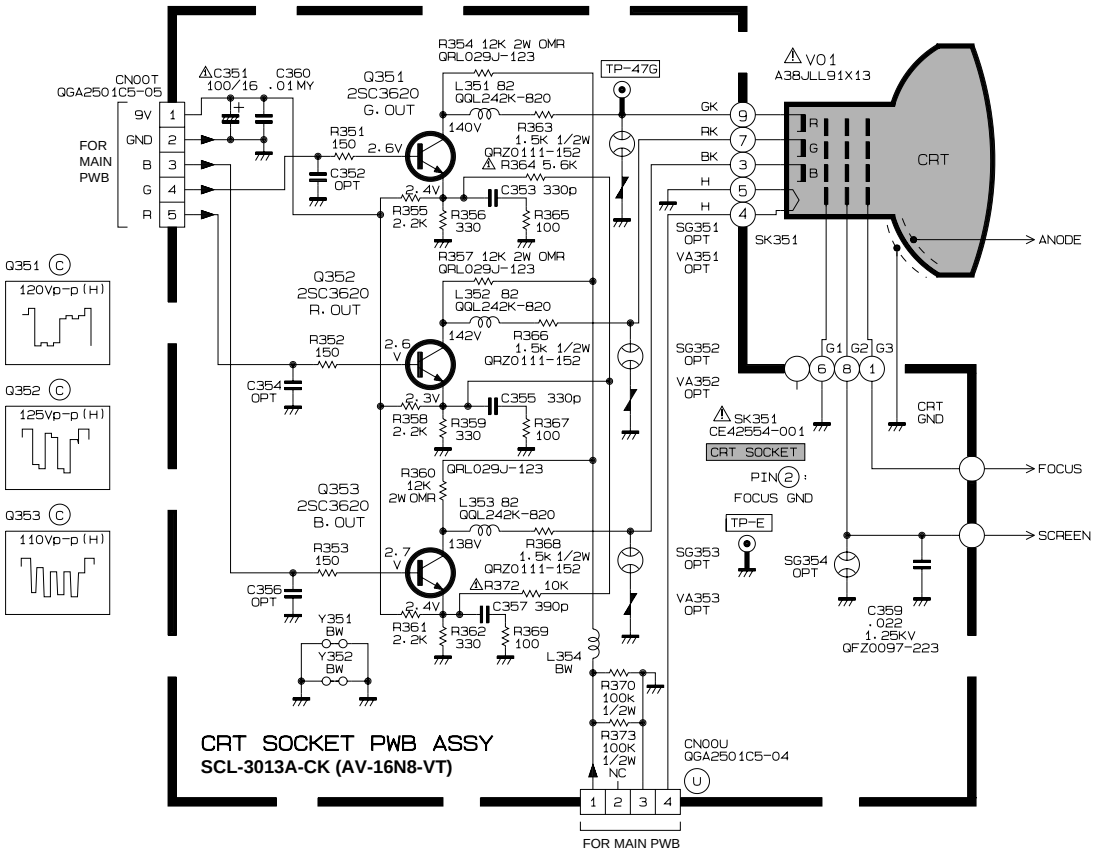
N PWB CIRCUIT DIAGRAM (2/3)



CIRCUIT DIAGRAM (3/3)

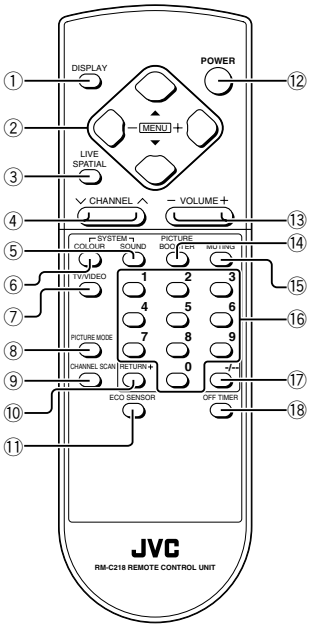


SOCKET PWB CIRCUIT DIAGRAM



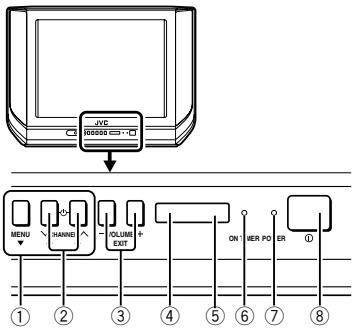
Locations

Locations of remote control buttons



① DISPLAY button	p.18
② MENU buttons • MENU ▲/▼ buttons • MENU –/+ buttons	
③ LIVE SPATIAL button	p.16
④ CHANNEL ∨/∧ buttons	p.12
⑤ SOUND SYSTEM button	p.15
⑥ COLOUR SYSTEM button	p.15
⑦ TV/VIDEO button	p.14
⑧ PICTURE MODE button	p.15
⑨ CHANNEL SCAN button	p.19
⑩ RETURN + button	p.20
⑪ ECO SENSOR button	p.19
⑫ POWER button	p.6,12,13
⑬ VOLUME –/+ buttons	p.13
⑭ PICTURE BOOSTER button	p.17
⑮ MUTING button	p.16
⑯ Number buttons	p.12
⑰ -/-- button	p.12
⑱ OFF TIMER button	p.18

Locations of front panel buttons and lamps



① MENU buttons • MENU button • MENU –/+ buttons	p.24
② CHANNEL ∨/∧ buttons	p.13
③ VOLUME –/+ buttons	p.13
④ ECO sensor	
⑤ Remote control sensor	
⑥ ON TIMER lamp	p.21
⑦ POWER lamp	p.6,13
⑧ Main power button	p.6,13

OPERATING INSTRUCTIONS